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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TRA, TUYEN Q

ART UNIT PAPER NUMBER

2873

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/804,061

Applicant(s)

AOKI ET AL.

Examiner

Tuyen Q Tra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-15 21-25 is/are allowed.
- 6) ☒ Claim(s) 1-4, 11 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 5-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0304</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 11 and 19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 11 and 19 recites “the ferroelectric members constituting the core layer are oriented in such a manner that directions of one of the (001), (110) and (111) planes of the ferroelectric members are uniform”. These (001), (110) and (111) planes are introduced in applicant paragraph [0120], but are not defined.

Applicant discloses in paragraph [0120] “in the first to seventh embodiments described above, it is preferable to orient the photonic crystals of the ferroelectric columns 4 in such a manner that the directions of one of the (001), (110) and (111) planes are uniform. The directions of the crystal plane can be aligned by growing the ferroelectric columns 4 in such a manner than the crystal plane is made parallel to the substrate surface.” This description is not sufficient enough to support or to enable one skill in the art to fully understand what applicant refer to (001), (110) or (111) planes in claim invention. These derive a question what is (001), (110) or (111) planes? An appropriate correction is requires.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this-section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4 and 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Jasper et al. (U.S. Pat. 5,739,796 A).

a) With respect to claim 1, Jasper et al. et al. discloses an ultra-wideband photonic band gap crystal having selectable and controllable bad gaps and methods for achieving photonic band gaps in Figures 3 and 10 comprising of a core layer (item 5) containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a two-dimensional directions; and electrodes (not shown) for applying an electric field to the core layer (see reference claim 43).

b) With respect to claim 16, Jasper et al. discloses an ultra-wideband photonic band gap crystal having selectable and controllable bad gaps and methods for achieving photonic band gaps in Figures 3 and 10 comprising of a core layer including a first member (item 5) disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the core layer (reference claim 43).

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- c) With respect to claim 2, Jasper et al. further discloses wherein polarization axes of the ferroelectric members in the core layer stand upright along a thickness direction of the core layer.
- d) With respect to claims 3 and 20, Jasper et al. further disclose wherein a clad layer disposed on both sides of the core layer and sandwiching the core layer, an effective refractive index of the clad layer being smaller than an effective refractive index of the core layer.
- e) With respect to claim 4, Jasper et al. further discloses wherein the clad layer has a periodical structure having regions of different refractive indices disposed periodically.
- f) With respect to claims 11 and 17, Jasper et al. further discloses wherein the first member is made of ferroelectric material having a piezoelectric effect and the second member is made of material softer than the first member.
- g) With respect to claims 18 and 19, Jasper et al. further disclose wherein each of the ferroelectric members constituting the core layer extends from one surface to the other of the core layer, and the electrodes are disposed sandwiching the core layer and directly contact each of the ferroelectric members; wherein the ferroelectric members constituting the core layer are aligned in such a manner that directions of one of (001), (110) and (111) planes of the ferroelectric members are uniform.

Allowable Subject Matter

4. Claims 12-15 and 21-25 are allowed.

The reason for the indication of allowable subject matter is that (claim 12) a first optical filter; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters

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comprises: a core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions; and electrodes for applying an electric field to the core layer, and wherein band gaps of the photonic crystals of the first and second optical filters are apart from each other by a wavelength interval; (claim 14) a laser oscillator for radiating a laser beam having wavelength distributed in a range from a first wavelength to a second wavelength; a first optical filter upon which the laser beam radiated from the laser oscillator becomes incident; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions; and electrodes for applying an electric field to the core layer, and wherein band gaps of the photonic crystals of the first and second optical filters are apart from each others by a wavelength interval and partially overlap the range between the first wavelength and the second wavelength; (claim 21) a first optical filter; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer including a first member disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the

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core layer, and wherein band gaps of the photonic crystals of the first and second optical filters are apart from each other by a wavelength interval; (claim 23) a laser oscillator for radiating a laser beam having wavelengths distributed in a range from a first wavelength to a second wavelength; a first optical filter upon which the laser beam radiated from the laser oscillator becomes incident; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer including a first member disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the core layer, and wherein, band gaps of the photonic crystals of the first and second optical filters are apart from each other by a wavelength interval and partially overlap the range between the first wavelength and the second wavelength; (claim 25) forming a resist film on a substrate; forming openings in the resist film, the openings being disposed periodically along a one-dimensional direction or two-dimensional directions; filling precursor solution of a ferroelectric substance in the openings and drying the solution to form precursors; removing the resist film; and baking the precursors to form ferroelectric members disclosed in the claims is not found in the prior art

5. Claims 5-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The reason for the indication of allowable subject matter is that (claim 5) wherein the clad layer contains photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions disclosed in the claims is not found in the prior art.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a) Domash et al. (US Patent 6,567,573 B1) discloses a switchable optical component in Figure 1A and 1B with teaching of a core layer (12) sandwiched in two cladding layers (16).
 - b) Hamada (US Patent 6,798,960 B2) discloses an optical device in figure 5A with teaching of claims 1 and 16' s limitations.
 - c) Deacon et al. (US Patent 5,887,089) discloses a low insertion loss optical switch in display architecture with teaching of claim 16' s limitations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyen Tra whose telephone number is (571) 272-2343. The examiner can normally be reached on Monday to Thursday from 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps, can be reached on (571) 272 - 2328. The fax number for this Group is (703) 872-9306.

tt

November 27, 2004


Hung Xuan Dang
Primary Examiner